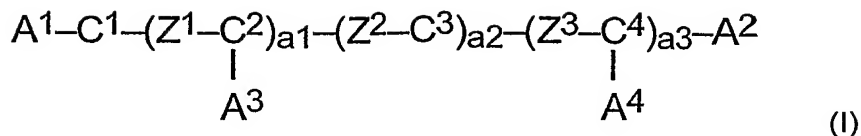


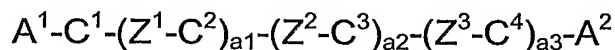
Claims

1. A mesogenic, cross-linkable mixture comprising:
 - i) a cross-linkable liquid crystalline host comprising at least one cross-linkable liquid crystalline compound, and
 - ii) at least one chiral or achiral rod shaped additive component, wherein said additive component has a rigid core and comprises at least two fused or linked, optionally substituted, non-aromatic, aromatic, carbocyclic or heterocyclic groups, and also comprises at least one optionally substituted alkyl residue, and at least one polymerizable group and wherein the additive component has a transition temperature to the isotropic state of 40 °C or lower.
2. A mixture according to claim 1, wherein the additive component has a transition temperature to the isotropic state of 20 °C or lower.
3. A mixture according to claim 1, wherein the additive component has a transition temperature to the isotropic state of 0 °C or lower.
4. A mixture according to any one of claims 1 to 3 having a clearing temperature of 30 °C or higher.
5. A mixture according to any one of claims 1 to 3 having a clearing temperature of 50 °C or higher.
6. A mixture according to any one of claims 1 to 5, wherein the liquid crystalline host has a clearing temperature of 50 °C or higher.
7. A mixture according to any preceding claim, wherein the additive component is a compound of formula (I):



wherein:

- A^1 to A^4 are independently from each other hydrogen, a polar group such as nitro, cyano, a halogen, an optionally substituted methyl group, or an optionally substituted hydrocarbon group of 2 to 40 C-atoms, in which one or more C-atoms may be replaced by a heteroatom, in such a way that oxygen atoms are not linked to one another,
with the proviso that at least one of A^1 to A^4 comprises a polymerizable group,
- C^1 to C^4 are independently from each other optionally substituted non-aromatic, aromatic, carbocyclic or heterocyclic groups, preferably connected to each other at the opposite positions via the bridging groups Z^1 to Z^3 ,
- Z^1 to Z^3 are independently from each other -CH(OH)-, -CO-, -CH₂(CO)-, -SO-, -CH₂(SO)-, -SO₂-, -CH₂(SO₂)-, -COO-, -OCO-, -COCF₂-, -CF₂CO-, -S-CO-, -CO-S-, -SOO-, -OSO-, -SOS-, -CH₂-CH₂-, -OCH₂-, -CH₂O-, -CH=CH-, -C≡C-, -CH=CH-COO-, -OCO-CH=CH-, -CH=N-, -C(CH₃)=N-, -N=N- or a single covalent bond,
- a_1 , a_2 and a_3 are independently from each other integers from 0 to 3, such that $1 \leq a_1 + a_2 + a_3 \leq 3$,
with the proviso that the sequence:



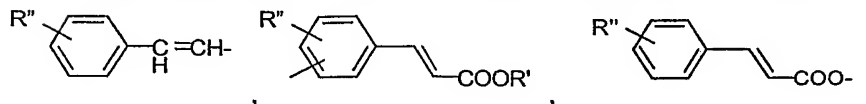
describes the long molecular axis of the rod shaped additive components.

8. A mixture according to claim 7, wherein the additive component is a compound of formula (I), wherein at least one of A^1 to A^4 includes a polymerizable group, selected from a residue of formula (II):

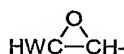


wherein:

P is hydrogen or a polymerizable group selected from groups comprising $\text{CH}_2=\text{CW}-$, $\text{CH}_2=\text{CW}-\text{O}-$, $\text{CH}_2=\text{CW}-\text{COO}-$, $\text{CH}_2=\text{C}(\text{Ph})-\text{COO}-$, $\text{CH}_2=\text{CH}-\text{COO}-\text{Ph}-$, $\text{CH}_2=\text{CW}-\text{CO}-\text{NH}-$, $\text{CH}_2=\text{C}(\text{Ph})-\text{CONH}-$, $\text{CH}_2=\text{C}(\text{COOR}')-\text{CH}_2-\text{COO}-$, $\text{CH}_2=\text{CH}-\text{OOC}-$, $(\text{Ph})-\text{CH}=\text{CH}-$, $\text{CH}_3-\text{CH}=\text{N}-(\text{CH}_2)_{m1}-$, $\text{HO}-$, $\text{HS}-$, $\text{HO}-(\text{CH}_2)_{m1}-$, $\text{HS}-(\text{CH}_2)_{m1}-$, $\text{HO}(\text{CH}_2)_{m1}\text{COO}-$, $\text{HS}(\text{CH}_2)_{m1}\text{COO}-$, $\text{HWN}-$, $\text{HOC}(\text{O})-$, $\text{CH}_2=\text{CH}-\text{Ph}-(\text{O})_{m2}$,



or



wherein:

W is H, F, Cl, Br or I or a C_{1-6} alkyl group,

m_1 is an integer having a value of from 1 to 9,

m_2 is an integer having a value of 0 or 1,

R' is a C_{1-6} alkyl group,

R'' is a C_{1-6} alkyl group, methoxy, cyano, F, Cl, Br or I,

Sp is an optionally substituted straight or branched C_{1-30} alkylene group, in which one or more $-\text{CH}_2-$ groups may be replaced by a heteroatom and/or by a polar group and/or it is optionally possible that one or more carbon-carbon single bond(s) is/are replaced by a carbon-carbon double or a triple bond,

k is an integer having a value of from 0 to 4,

X is $-\text{O}-$, $-\text{S}-$, $-\text{NH}-$, $-\text{N}(\text{CH}_3)-$, $-\text{CH}(\text{OH})-$, $-\text{CO}-$, $-\text{CH}_2(\text{CO})-$, $-\text{SO}-$, $-\text{CH}_2(\text{SO})-$, $-\text{SO}_2-$, $-\text{CH}_2(\text{SO}_2)-$, $-\text{COO}-$, $-\text{OCO}-$, $-\text{OCO}-\text{O}-$, $-\text{S}-\text{CO}-$, $-\text{CO}-\text{S}-$, $-\text{SOO}-$, $-\text{OSO}-$, $-\text{SOS}-$, $-\text{CH}_2-\text{CH}_2-$, $-\text{OCH}_2-$, $-\text{CH}_2\text{O}-$, $-\text{CH}=\text{CH}-$, $-\text{C}\equiv\text{C}-$, or a single bond,

t is an integer having a value of 0 or 1.

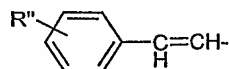
9. A mixture according to any one of claims 7 to 8, wherein at least one of A^1 to A^4 of formula (I) is a group of formula (II):



wherein:

P

is a polymerizable group such as $\text{CH}_2=\text{CW}-$,
 $\text{CH}_2=\text{CW}-\text{O}-$, $\text{CH}_2=\text{CW}-\text{COO}-$ or



wherein:

W is H, CH_3 , F, Cl, Br or I,

R'' is a C_{1-6} alkyl group, methoxy, cyano, F, Cl, Br or I.

Sp

is a C_{1-22} branched or straight-chain alkylene group, in which one or more $-\text{CH}_2-$ groups present in the hydrocarbon chain may be replaced, independently, by one or more groups selected from $-\text{O}-$, $-\text{CH}(\text{OH})-$, $-\text{SO}_2-$, $-\text{COO}-$, $-\text{OCO}-$, $-\text{OCO}-\text{O}-$, $-\text{CH}=\text{CH}-$, $-\text{C}\equiv\text{C}-$, $-(\text{CF}_2)_r-$, with the proviso that no two oxygen atoms are directly linked to each other, and wherein r is an integer between 1 and 10,

k

is 1,

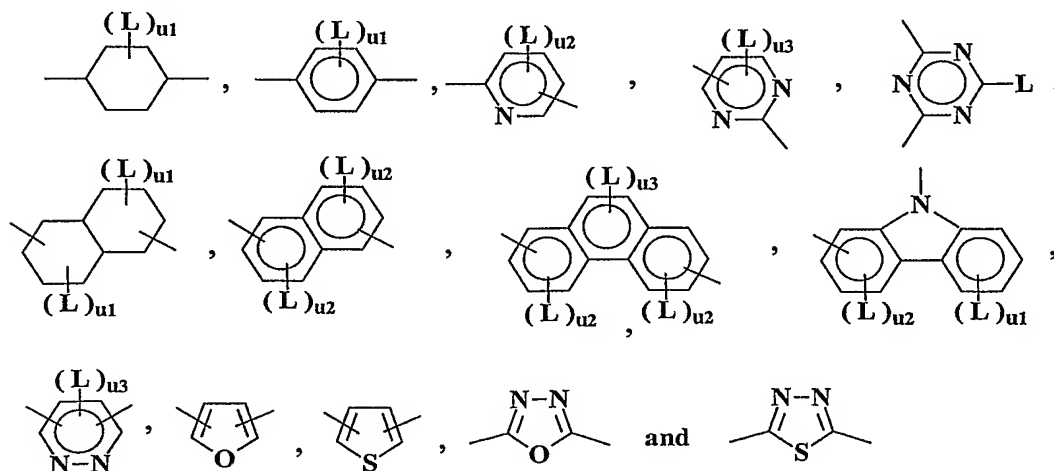
X

is $-\text{O}-$, $-\text{CO}-$, $-\text{COO}-$, $-\text{OCO}-$, $-\text{CH}=\text{CH}-$, $-\text{C}\equiv\text{C}-$, or a single bond, more preferably $-\text{O}-$, $-\text{COO}-$, $-\text{OCO}-$ or a single bond,

t

is 1.

10. A mixture according to any one of claims 7 to 9, wherein C^1 to C^4 are preferably selected from:



wherein:

- L is -CH₃, -COCH₃, -NO₂, -CN or halogen,
 u1 is 0, 1, 2, 3, or 4,
 u2 is 0, 1, 2, or 3,
 u3 is 0, 1, or 2.

11. A mixture according to any one of claims 7 to 10, wherein:

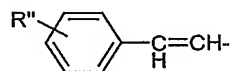
C¹ to C⁴ are selected from optionally substituted cyclohexyl or cyclohexylene, phenyl or phenylene, naphthyl or naphthylene or phenanthryl or phenanthrylene,

A¹ to A⁴ independently from each other is hydrogen, a polar group such as cyano, nitro, a halogen, or a group of formula (II)



in which:

P is hydrogen or a polymerizable group such as CH₂=CW-, CH₂=CW-O-, CH₂=CW-COO- or



wherein:

W is H, CH₃, F, Cl Br or I,

R'' is a C₁₋₆ alkyl group, methoxy, cyano, F, Cl, Br or I,

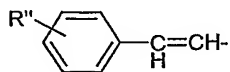
Sp is a C₁₋₂₂ branched or straight-chain alkylene group, in which one or more -CH₂- groups present in the hydrocarbon chain may be replaced, independently, by one or more groups selected from -O-, -CH(OH)-, -SO₂-, -COO-, -OCO-, -OCO-O-, -CH=CH-, -C≡C-, -(CF₂)_r -, with the proviso that no two oxygen atoms are directly linked to each other, and wherein r is an integer between 1 and 10,

k is 1,

X is -O-, -CO-, -COO-, -OCO-, -CH=CH-, -C≡C-, or a single bond, more preferably -O-, -COO-, -OCO- or a single bond,

t is 1,

with the proviso that at least one of A¹ to A⁴ comprises a polymerizable group such as CH₂=CW-, CH₂=CW-O-, CH₂=CW-COO- or



wherein:

W is H, CH₃, F, Cl, Br or I,

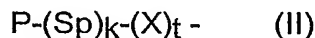
R'' is a C₁₋₆ alkyl group, methoxy, cyano, F, Cl, Br or I.

12. A mixture according to any one of claims 7 to 11, wherein:

A¹ comprises a polymerizable group such as CH₂=CW-, CH₂=CW-O-, CH₂=CW-COO-,
wherein:

W is H or CH₃,

A² has the meaning of formula (II),



in which:

P is hydrogen or a polymerizable group such as CH₂=CW-, CH₂=CW-O- or CH₂=CW-COO-,
wherein:

W is H or CH₃,

Sp is a branched C₃-C₁₆ alkylene group, optionally comprising at least one oxocarbonyl or carbonyloxy group, or is a straight C₂-C₁₆ alkylene group, comprising at least one oxocarbonyl or carbonyloxy group, wherein one or more -CH₂- groups present in the hydrocarbon chain may be replaced, independently, by one or more groups selected from -O-, -CH=CH-, -C≡C-,

with the proviso that no two oxygen atoms are directly linked to each other,

k is 1,

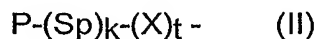
X is -O-, -CO-, -COO-, -OCO-, -CH=CH-, -C≡C-, or a single bond, more preferably -O-, -COO-, -OCO- or a single bond,

t is 1

A⁴ is hydrogen.

13. A mixture according to any one of claims 7 to 12, wherein:

A¹ has the meaning of formula (II),



wherein:

P is hydrogen or a polymerizable group such as CH₂=CW-, CH₂=CW-O- or CH₂=CW-COO-, wherein:

W is H or CH₃,

Sp is a branched C₃-C₁₆ alkylene group, optionally comprising at least one oxocarbonyl or group, or is a straight C₂-C₁₆ alkylene group, comprising at least one oxocarbonyl or carbonyloxy group, wherein one or more -CH₂- groups present in the hydrocarbon chain may be replaced, independently, by one or more groups selected from -O-, -CH=CH-, -C≡C-, with the proviso that no two oxygen atoms are directly linked to each other,

k is 1,

X is -O-, -CO-, -COO-, -OCO-, -CH=CH-, -C≡C-, or a single bond, more preferably -O-, -COO-, -OCO- or a single bond,

t is 1,

A²

comprises a polymerizable group such as CH₂=CW-, CH₂=CW-O-, or CH₂=CW-COO-, wherein:

W is H or CH₃,

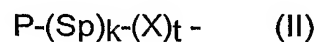
A⁴

is hydrogen.

14. A mixture according to any one of claims 7 to 13, wherein:

A¹

has the meaning of formula (II),



wherein:

P is hydrogen or a polymerizable group such as CH₂=CW-, CH₂=CW-O- or CH₂=CW-COO-, wherein:

W is H or CH₃,

Sp is a branched C₃-C₁₆ alkylene group, optionally comprising at least one oxocarbonyl or carbonyloxy group, or is a straight C₂-C₁₆ alkylene group, comprising at least one oxocarbonyl or carbonyloxy group, wherein one or more -CH₂- groups present in the hydrocarbon chain may be replaced, independently, by one or more groups selected from -O-, -CH=CH-, -C≡C-, with the proviso that no two oxygen atoms are directly linked to each other,

k is 1,

X is -O-, -CO-, -COO-, -OCO-, -CH=CH-, -C≡C-, or a single bond, more preferably -O-, -COO-, -OCO- or a single bond,

t is 1,

A³

comprises a polymerizable group such as CH₂=CW-, CH₂=CW-O-, or CH₂=CW-COO-, wherein:

W is H or CH₃,

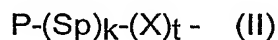
A⁴

is hydrogen.

15. A mixture according to any one of claims 7 to 14, wherein:

A²

has the meaning of formula (II),



in which:

P is hydrogen or a polymerizable group such as CH₂=CW-, CH₂=CW-O- or CH₂=CW-COO-, wherein:

W is H or CH₃,

Sp is a branched C₃-C₁₆ alkylene group, optionally comprising at least one oxocarbonyl or carbonyloxy group, or is a straight C₂-C₁₆ alkylene group, comprising at least one oxocarbonyl or carbonyloxy group, wherein one or more -CH₂- groups present in the hydrocarbon chain may be replaced, independently, by one or more groups selected from -O-, -CH=CH-, -C≡C-, with the proviso that no two oxygen atoms are directly linked to each other,

k is 1,

X is -O-, -CO-, -COO-, -OCO-, -CH=CH-, -C≡C-, or a single bond, more preferably -O-, -COO-, -OCO- or a single bond,

t is 1,

A³

comprises a polymerizable group such as CH₂=CW-, CH₂=CW-O-, or CH₂=CW-COO-, wherein:

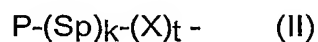
W is H or CH₃,

A⁴

is hydrogen.

16. A mixture according to any one of claims 7 to 15, wherein:

A¹ and A² have the meaning of formula (II),



wherein:

P is hydrogen or a polymerizable group such as CH₂=CW-, CH₂=CW-O- or CH₂=CW-COO-, wherein:

W is H or CH₃,

Sp is a branched C₃-C₁₆ alkylene group, optionally comprising at least one oxocarbonyl or carbonyloxy group, or is a straight C₂-C₁₆ alkylene group, comprising at least one oxocarbonyl or carbonyloxy group, wherein one or more -CH₂- groups present in the hydrocarbon chain may be replaced, independently, by one or more groups selected from -O-, -CH=CH-, -C≡C-, with the proviso that no two oxygen atoms are directly linked to each other,

k is 1,

X is -O-, -CO-, -COO-, -OCO-, -CH=CH-, -C≡C-, or a single bond, more preferably -O-, -COO-, -OCO- or a single bond,
 t is 1,
 A^3 comprises a polymerizable group such as $CH_2=CW-$, $CH_2=CW-O-$, or $CH_2=CW-COO-$, wherein:
 W is H or CH_3 ,
 A^4 is hydrogen.

17. A mixture according to any one of claims 7 to 16, wherein at least one of A^1 to A^3 has the meaning of formula (II),

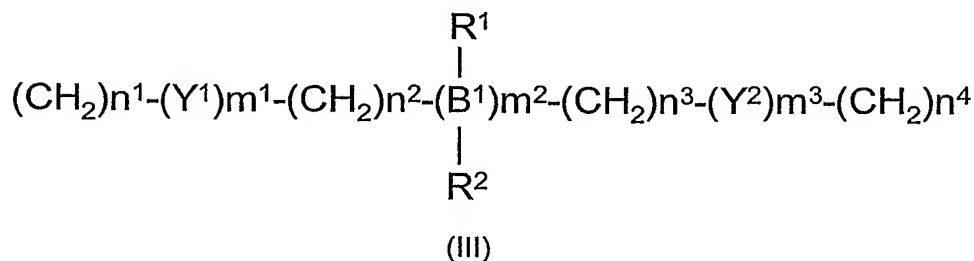


wherein:

P is hydrogen or a polymerizable group such as $CH_2=CW-$, $CH_2=CW-O-$, $CH_2=CW-COO-$, wherein:

W is H or CH_3 ,

Sp has the meaning of formula (III)



wherein:

Y^1 and Y^2 each independently represent -OCO- or -COO-,
 B^1 represents C or CH,

R^1 and R^2 each independently represent hydrogen or a C₁-C₁₂ alkyl residue, preferably a C₁-C₆ alkyl residue, such as a methyl, ethyl, propyl, butyl, pentyl, hexyl or isopropyl residue,

n_1, n_2, n_3 and n_4 are independently integers from 0 to 15, such that $0 \leq n_1 + n_2 + n_3 + n_4 \leq 15$,

m_1, m_2 and m_3 are independently integers from 0 to 3, such that $1 \leq m_1 + m_2 + m_3 \leq 3$ and

wherein:

one or more -CH₂-groups present in the hydrocarbon chain of (III) may be replaced, independently, by one or more groups selected from -O-, -CH=CH- or -C≡C-, with the proviso that the carbon-carbon double bond of P is not directly connected to the carbon atom of Y^1 or Y^2 ,

k is 1,
 X is -O-, -CO-, -COO-, -OCO-, -CH=CH-, -C≡C-, or a single bond, more preferably -O-, -COO-, -OCO- or a single bond,
 t is 1.

18. A mixture according to any one of claims 7 to 17, wherein at least one of A^1 to A^3 has the meaning of formula (II),



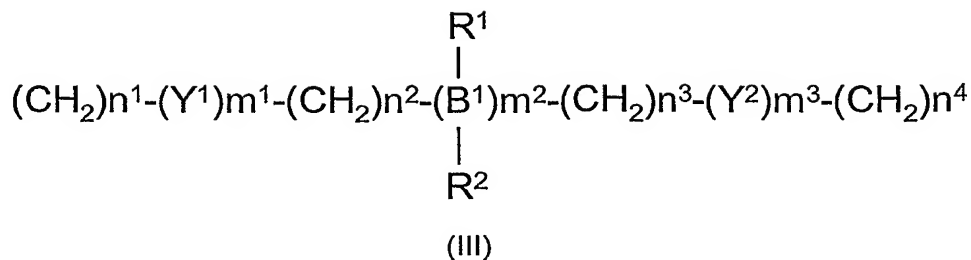
wherein:

P is hydrogen or a polymerizable group such as CH₂=CW-, CH₂=CW-O-, CH₂=CW-COO-,

wherein:

W is H or CH₃,

Sp has the meaning of formula (III)



wherein:

Y^1 and Y^2 each independently represent $-\text{OCO}-$ or $-\text{COO}-$,
 B^1 represents C or CH,
 R^1 is hydrogen
 R^2 represents a methyl, ethyl, propyl, butyl, pentyl or hexyl group and most preferably a methyl or ethyl group,
 n^1, n^2, n^3 and n^4 are independently integers from 0 to 15, such that $0 \leq n^1 + n^2 + n^3 + n^4 \leq 15$,
 m^1, m^2 and m^3 are independently integers from 0 to 3, such that $1 \leq m^1 + m^2 + m^3 \leq 3$, and

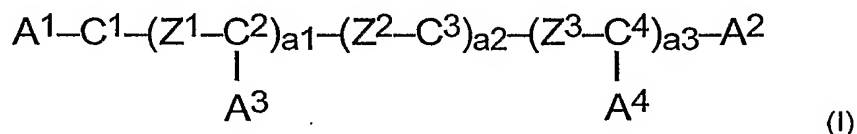
wherein:

one or more $-\text{CH}_2-$ groups present in the hydrocarbon chain of (III) may be replaced, independently, by one or more groups selected from $-\text{O}-$, $-\text{CH}=\text{CH}-$ or $-\text{C}\equiv\text{C}-$,
 with the proviso that the carbon-carbon double bond of P is not directly connected to the carbon atom of Y^1 or Y^2 ,

k is 1,
 X is $-\text{O}-$, $-\text{CO}-$, $-\text{COO}-$, $-\text{OCO}-$, $-\text{CH}=\text{CH}-$, $-\text{C}\equiv\text{C}-$, or a single bond, more preferably $-\text{O}-$, $-\text{COO}-$, $-\text{OCO}-$ or a single bond,
 t is 1.

19. A mixture according to any one of claims 1 to 18 comprising further agents, such as cross-linking agents, stabilizing agents, initiators, dyes, other chiral or achiral additives and plasticizers.

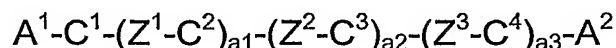
20. A mixture according to any one of claims 1 to 19 in form of an elastomer, polymer gel, polymer network or polymer film.
21. A chiral or achiral rod shaped compound, wherein said compound has a rigid core and comprises at least two fused or linked, optionally substituted, non-aromatic, aromatic, carbocyclic or heterocyclic groups, and also comprises at least one optionally substituted alkyl residue, and also comprises at least one polymerizable group and has a transition temperature to the isotropic state of 40 °C or lower.
22. A compound according to claim 21, wherein the compound has a transition temperature to the isotropic state of 20 °C or lower.
23. A compound according to claims 21 to 22, wherein the compound has transition temperature to the isotropic state of 0 °C or lower.
24. A compound according to any one of claims 21 to 23 of formula (I):



wherein:

- | | |
|----------------------------------|--|
| A ¹ to A ⁴ | are independently from each other hydrogen, a polar group such as nitro, cyano, a halogen, an optionally substituted methyl group, or an optionally substituted hydrocarbon group of 2 to 40 C-atoms, in which one or more C-atoms may be replaced by a heteroatom, in such a way that oxygen atoms are not linked to one another, |
| | with the proviso that at least one of A ¹ to A ⁴ comprises a polymerizable group, |
| C ¹ to C ⁴ | are independently from each other optionally substituted non-aromatic, aromatic, carbocyclic or heterocyclic groups, preferably connected to each other at the opposite positions via the bridging groups Z ¹ to Z ³ , |

- Z^1 to Z^3 are independently from each other $-\text{CH}(\text{OH})-$, $-\text{CO}-$, $-\text{CH}_2(\text{CO})-$, $-\text{SO}-$, $-\text{CH}_2(\text{SO})-$, $-\text{SO}_2-$, $-\text{CH}_2(\text{SO}_2)-$, $-\text{COO}-$, $-\text{OCO}-$, $-\text{COCF}_2-$, $-\text{CF}_2\text{CO}-$, $-\text{S-CO}-$, $-\text{CO-S}-$, $-\text{SOO}-$, $-\text{OSO}-$, $-\text{SOS}-$, $-\text{CH}_2\text{-CH}_2-$, $-\text{OCH}_2-$, $-\text{CH}_2\text{O}-$, $-\text{CH=CH}-$, $-\text{C}\equiv\text{C}-$, $-\text{CH=CH-COO}-$, $-\text{OCO-CH=CH}-$, $-\text{CH=N}-$, $-\text{C}(\text{CH}_3)=\text{N}-$, $-\text{N=N}-$ or a single covalent bond,
- a_1 , a_2 and a_3 are independently from each other integers from 0 to 3, such that $1 \leq a_1 + a_2 + a_3 \leq 3$,
- with the proviso that the sequence:



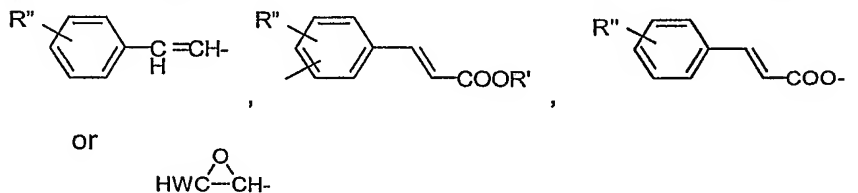
describes the long molecular axis of the rod shaped additive components.

25. A compound according to claim 24, wherein at least one of A^1 to A^4 includes a polymerizable group, selected from a residue of formula (II):



wherein:

- P is hydrogen or a polymerizable group selected from groups comprising $\text{CH}_2=\text{CW}-$, $\text{CH}_2=\text{CW-O}-$, $\text{CH}_2=\text{CW-COO}-$, $\text{CH}_2=\text{C(Ph)-COO}-$, $\text{CH}_2=\text{CH-COO-Ph}-$, $\text{CH}_2=\text{CW-CO-NH}-$, $\text{CH}_2=\text{C(Ph)-CONH}-$, $\text{CH}_2=\text{C(COOR')-CH}_2\text{-COO}-$, $\text{CH}_2=\text{CH-OOC}-$, $(\text{Ph})\text{-CH=CH}-$, $\text{CH}_3\text{-CH=N-(CH}_2\text{)}_{m_1}-$, $\text{HO}-$, $\text{HS}-$, $\text{HO-(CH}_2\text{)}_{m_1}-$, $\text{HS-(CH}_2\text{)}_{m_1}-$, $\text{HO(CH}_2\text{)}_{m_1}\text{COO}-$, $\text{HS(CH}_2\text{)}_{m_1}\text{COO}-$, $\text{HWN}-$, HOC(O)- , $\text{CH}_2=\text{CH-Ph-(O)}_{m_2}$,



wherein:

- W is H, F, Cl, Br or I or a C_{1-6} alkyl group,
 m_1 is an integer having a value of from 1 to 9,

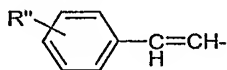
- m_2 is an integer having a value of 0 or 1,
 R' is a C_{1-6} alkyl group,
 R'' is a C_{1-6} alkyl group, methoxy, cyano, F, Cl, Br or I,
 Sp is an optionally substituted straight or branched C_{1-30} alkylene group, in which one or more $-CH_2-$ groups may be replaced by a heteroatom and/or by a polar group and/or it is optionally possible that one or more carbon-carbon single bond(s) is/are replaced by a carbon-carbon double or a triple bond,
 k is an integer having a value of from 0 to 4,
 X is $-O-$, $-S-$, $-NH-$, $-N(CH_3)-$, $-CH(OH)-$, $-CO-$, $-CH_2(CO)-$, $-SO-$, $-CH_2(SO)-$, $-SO_2-$, $-CH_2(SO_2)-$, $-COO-$, $-OCO-$, $-OCO-O-$, $-S-CO-$, $-CO-S-$, $-SOO-$, $-OSO-$, $-SOS-$, $-CH_2-CH_2-$, $-OCH_2-$, $-CH_2O-$, $-CH=CH-$, $-C\equiv C-$, or a single bond,
 t is an integer having a value of 0 or 1.

26. A compound according to any one of claims 24 or 25, wherein at least one of A^1 to A^4 of formula (I) is a group of formula (II):



wherein:

- P is a polymerizable group such as $CH_2=CW-$,
 $CH_2=CW-O-$, $CH_2=CW-COO-$ or

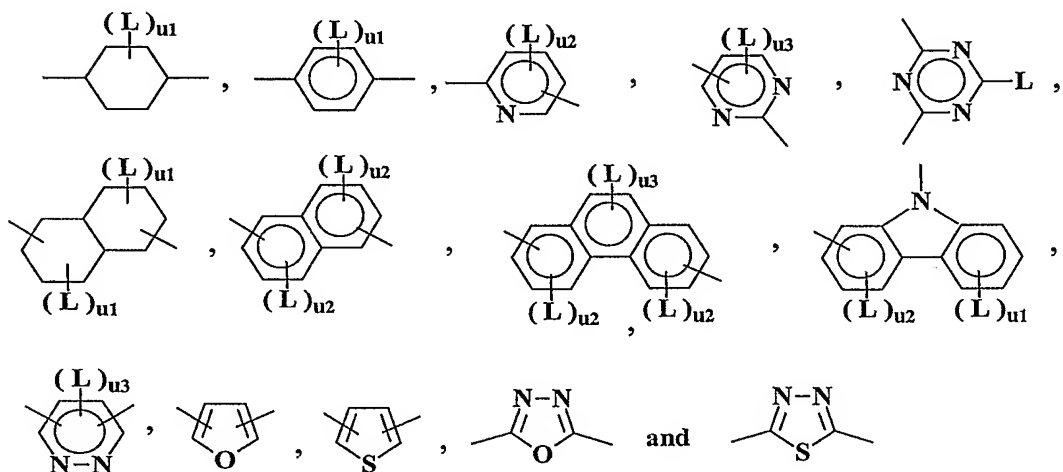


wherein:

- W is H, CH_3 , F, Cl, Br or I,
 R'' is a C_{1-6} alkyl group, methoxy, cyano, F, Cl, Br or I.
 Sp is a C_{1-22} branched or straight-chain alkylene group, in which one or more $-CH_2-$ groups present in the hydrocarbon chain may be replaced, independently, by one or more groups selected from $-O-$, $-CH(OH)-$, $-SO_2-$, $-COO-$, $-OCO-$, $-OCO-O-$, $-CH=CH-$, $-C\equiv C-$, $-(CF_2)_r-$,
 with the proviso that no two oxygen atoms are directly linked to each other, and wherein r is an integer between 1 and 10,

k is 1,
 X is -O-, -CO-, -COO-, -OCO-, -CH=CH-, -C≡C-, or a single bond,
 more preferably -O-, -COO-, -OCO- or a single bond,
 t is 1.

27. A compound according to any one of claims 24 to 26 wherein C¹ to C⁴ are preferably selected from:



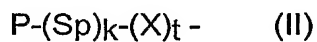
wherein:

L being -CH₃, -COCH₃, -NO₂, -CN or halogen,
 u1 is 0, 1, 2, 3, or 4,
 u2 is 0, 1, 2, or 3,
 u3 is 0, 1, or 2.

28. A compound according to any one of claims 24 to 27, wherein:

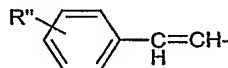
C¹ to C⁴ are selected from optionally substituted cyclohexyl or cyclohexylene, phenyl or phenylene, naphthyl or naphthylene or phenanthryl or phenanthrylene,

A¹ to A⁴ independently from each other is hydrogen, a polar group such as cyano, nitro, a halogen, or a group of formula (II),



in which:

P is hydrogen or a polymerizable group such as $\text{CH}_2=\text{CW}-$, $\text{CH}_2=\text{CW}-\text{O}-$, $\text{CH}_2=\text{CW}-\text{COO}-$ or



wherein:

W is H, CH_3 , F, Cl, Br or I,

R'' is a C_{1-6} alkyl group, methoxy, cyano, F, Cl, Br or I,

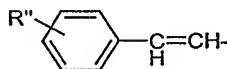
Sp is a C_{1-22} branched or straight-chain alkylene group, in which one or more $-\text{CH}_2-$ groups present in the hydrocarbon chain may be replaced, independently, by one or more groups selected from $-\text{O}-$, $-\text{CH}(\text{OH})-$, $-\text{SO}_2-$, $-\text{COO}-$, $-\text{OCO}-$, $-\text{OCO}-\text{O}-$, $-\text{CH}=\text{CH}-$, $-\text{C}\equiv\text{C}-$, $-(\text{CF}_2)_r-$, with the proviso that no two oxygen atoms are directly linked to each other, and wherein r is an integer between 1 and 10,

k is 1,

X is $-\text{O}-$, $-\text{CO}-$, $-\text{COO}-$, $-\text{OCO}-$, $-\text{CH}=\text{CH}-$, $-\text{C}\equiv\text{C}-$, or a single bond, more preferably $-\text{O}-$, $-\text{COO}-$, $-\text{OCO}-$ or single bond,

t is 1,

with the proviso that at least one of A1 to A4 comprises a polymerizable group such as $\text{CH}_2=\text{CW}-$, $\text{CH}_2=\text{CW}-\text{O}-$, $\text{CH}_2=\text{CW}-\text{COO}-$ or



wherein:

W is H, CH_3 , F, Cl, Br or I,

R'' is a C_{1-6} alkyl group, methoxy, cyano, F, Cl, Br or I.

29. A compound according to any one of claims 24 to 28, wherein:

A¹

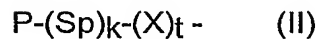
comprises a polymerizable group such as $\text{CH}_2=\text{CW}-$, $\text{CH}_2=\text{CW}-\text{O}-$, $\text{CH}_2=\text{CW}-\text{COO}-$,

wherein:

W is H or CH₃,

A²

has the meaning of formula (II),



in which:

P is hydrogen or a polymerizable group such as CH₂=CW-, CH₂=CW-O- or CH₂=CW-COO-,
wherein:

W is H or CH₃,

Sp is a branched C₃-C₁₆ alkylene group, optionally comprising at least one oxocarbonyl or carbonyloxy group, or is a straight C₂-C₁₆ alkylene group, comprising at least one oxocarbonyl or carbonyloxy group, wherein one or more -CH₂- groups present in the hydrocarbon chain may be replaced, independently, by one or more groups selected from -O-, -CH=CH-, -C≡C-, with the proviso that no two oxygen atoms are directly linked to each other,

k is 1,

X is -O-, -CO-, -COO-, -OCO-, -CH=CH-, -C≡C-, or a single bond, more preferably -O-, -COO-, -OCO- or a single bond,

t is 1

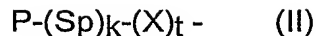
A⁴

is hydrogen.

30. A compound according to any one of claims 24 to 29, wherein:

A¹

has the meaning of formula (II),



wherein:

P is hydrogen or a polymerizable group such as $CH_2=CW-$, $CH_2=W-O-$ or $CH_2=CW-COO-$,
wherein:

W is H or CH_3 ,

Sp is a branched C_3-C_{16} alkylene group, optionally comprising at least one oxocarbonyl or carbonyloxy group, or is a straight C_2-C_{16} alkylene group, comprising at least one oxocarbonyl or carbonyloxy group, wherein one or more $-CH_2-$ groups present in the hydrocarbon chain may be replaced, independently, by one or more groups selected from $-O-$, $-CH=CH-$, $-C\equiv C-$, with the proviso that no two oxygen atoms are directly linked to each other,

k is 1,

X is $-O-$, $-CO-$, $-COO-$, $-OCO-$, $-CH=CH-$, $-C\equiv C-$, or a single bond, more preferably $-O-$, $-COO-$, $-OCO-$ or a single bond,

t is 1,

A^2

comprises a polymerizable group such as $CH_2=CW-$, $CH_2=CW-O-$, or $CH_2=CW-COO-$,
wherein:

W is H or CH_3 ,

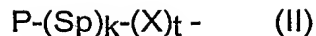
A^4

is hydrogen.

31. A compound according to any one of claims 24 to 30, wherein:

A^1

has the meaning of formula (II),



wherein:

P is hydrogen or a polymerizable group such as $CH_2=CW-$, $CH_2=CW-O-$ or $CH_2=W-COO-$,
wherein:

W is H or CH_3 ,

Sp is a branched C_3-C_{16} alkylene group, optionally comprising at least one oxocarbonyl or carbonyloxy group, or is a straight C_2-C_{16} alkylene group, comprising at least one oxocarbonyl or carbonyloxy group, wherein one or more $-CH_2-$ groups present in the hydrocarbon chain may be replaced, independently, by one or more groups selected from $-O-$, $-CH=CH-$, $-C\equiv C-$, with the proviso that no two oxygen atoms are directly linked to each other,

k is 1,

X is $-O-$, $-CO-$, $-COO-$, $-OCO-$, $-CH=CH-$, $-C\equiv C-$, or a single bond, more preferably $-O-$, $-COO-$, $-OCO-$ or a single bond,

t is 1,

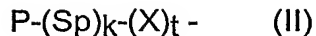
A^3 comprises a polymerizable group such as $CH_2=CW-$, $CH_2=CW-O-$, or $CH_2=CW-COO-$,
wherein:

W is H or CH_3 ,

A^4 is hydrogen.

32. A compound according to any one of claims 24 to 31, wherein:

A^2 has the meaning of formula (II),



wherein:

P is hydrogen or a polymerizable group such as $CH_2=CW-$, $CH_2=CW-O-$ or $CH_2=CW-COO-$,
wherein:

W is H or CH_3 ,

Sp is a branched C_3-C_{16} alkylene group, optionally comprising at least one oxocarbonyl or carbonyloxy group, or is a straight C_2-C_{16} alkylene group, comprising at least one oxocarbonyl or carbonyloxy group, wherein one or more $-CH_2-$ groups present in the hydrocarbon chain may be replaced, independently, by one or more groups selected from $-O-$, $-CH=CH-$, $-C\equiv C-$, with the proviso that no two oxygen atoms are directly linked to each other,

k is 1,

X is $-O-$, $-CO-$, $-COO-$, $-OCO-$, $-CH=CH-$, $-C\equiv C-$, or a single bond, more preferably $-O-$, $-COO-$, $-OCO-$ or a single bond,

t is 1,

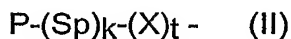
A^3 comprises a polymerizable group such as $CH_2=CW-$, $CH_2=CW-O-$, or $CH_2=CW-COO-$,
wherein:

W is H or CH_3 ,

A^4 is hydrogen.

33. A compound according to any one of claims 24 to 32, wherein:

A^1 and A^2 have the meaning of formula (II),



wherein:

P is hydrogen or a polymerizable group such as $\text{CH}_2=\text{CW}-$, $\text{CH}_2=\text{CW}-\text{O}-$ or $\text{CH}_2=\text{CW}-\text{COO}-$,
wherein:

W is H or CH_3 ,

Sp is a branched $\text{C}_3\text{-C}_{16}$ alkylene group, optionally comprising at least one oxocarbonyl or carbonyloxy group, or is a straight $\text{C}_2\text{-C}_{16}$ alkylene group, comprising at least one oxocarbonyl or carbonyloxy group, wherein one or more $-\text{CH}_2-$ groups present in the hydrocarbon chain may be replaced, independently, by one or more groups selected from $-\text{O}-$, $-\text{CH}=\text{CH}-$, $-\text{C}\equiv\text{C}-$, with the proviso that no two oxygen atoms are directly linked to each other,

k is 1,

X is $-\text{O}-$, $-\text{CO}-$, $-\text{COO}-$, $-\text{OCO}-$, $-\text{CH}=\text{CH}-$, $-\text{C}\equiv\text{C}-$, or a single bond, more preferably $-\text{O}-$, $-\text{COO}-$, $-\text{OCO}-$ or a single bond,

t is 1,

A^3 comprises a polymerizable group such as $\text{CH}_2=\text{CW}-$, $\text{CH}_2=\text{CW}-\text{O}-$, or $\text{CH}_2=\text{CW}-\text{COO}-$,
wherein:

W is H or CH_3 ,

A^4 is hydrogen.

34. A compound according to any one of claims 24 to 33, wherein at least one of A^1 to A^3 has the meaning of formula (II),

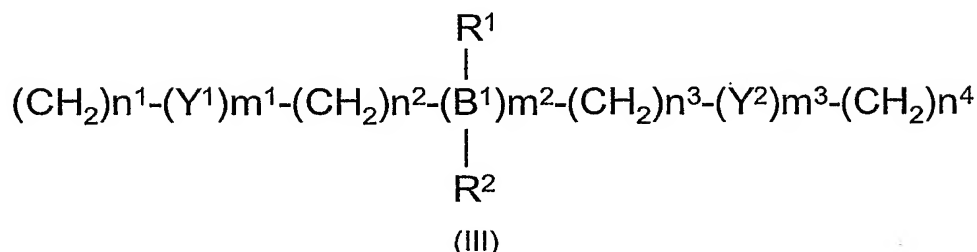


wherein:

P is hydrogen or a polymerizable group such as
 $\text{CH}_2=\text{CW}-$, $\text{CH}_2=\text{CW}-\text{O}-$, $\text{CH}_2=\text{CW}-\text{COO}-$,
 wherein:

W is H or CH_3 ,

Sp has the meaning of formula (III)



wherein:

Y^1 and Y^2 each independently represent $-\text{OCO}-$ or $-\text{COO}-$,

B^1 represents C or CH,

R^1 and R^2 each independently represent hydrogen or a
 C_1 - C_{12} alkyl residue, preferably a C_1 - C_6 alkyl
 residue, such as methyl, ethyl, propyl, butyl,
 pentyl, hexyl or isopropyl residue,

$n1$, $n2$, $n3$ and $n4$ are independently integers from 0 to 15, such
 that $0 \leq n1 + n2 + n3 + n4 \leq 15$,

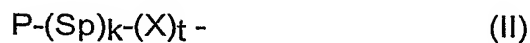
$m1$, $m2$ and $m3$ are independently integers from 0 to 3, such that
 $1 \leq m1 + m2 + m3 \leq 3$ and

wherein

one or more $-\text{CH}_2-$ groups present in the hydrocarbon chain
 of (III) may be replaced, independently, by one or more groups
 selected from $-\text{O}-$, $-\text{CH}=\text{CH}-$ or $-\text{C}\equiv\text{C}-$,
 with the proviso that the carbon-carbon double bond of P is
 not directly connected to the carbon atom of Y^1 or Y^2 ,

k is 1,
 X is -O-, -CO-, -COO-, -OCO-, -CH=CH-, -C≡C-, or a single bond, more preferably -O-, -COO-, -OCO- or a single bond,
 t is 1.

35. A compound according to any one of claims 24 to 34, wherein at least one of A¹ to A³ has the meaning of formula (II),

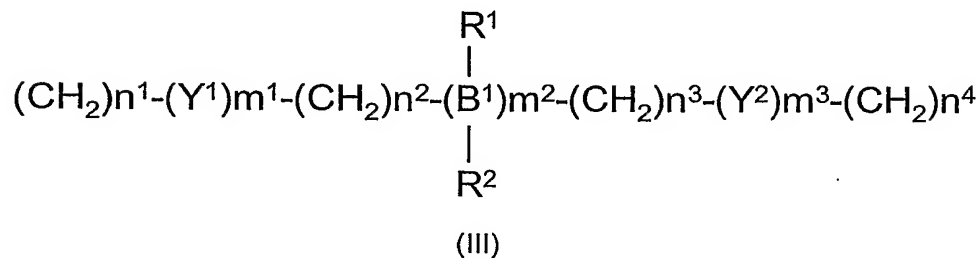


Wherein:

P is hydrogen or a polymerizable group such as CH₂=CW-,
 CH₂=CW-O-, CH₂=CW-COO-,
 wherein:

W is H or CH₃,

Sp has the meaning of formula (III)



wherein:

Y¹ and Y² each independently represent -OCO- or -COO-,

B¹ represents C or CH,

R¹ is hydrogen,

R² represents a methyl, ethyl, propyl, butyl, pentyl or hexyl group and most preferably a methyl or ethyl group,

n_1, n_2, n_3 and n_4 are independently integers from 0 to 15, such that $0 \leq n_1 + n_2 + n_3 + n_4 \leq 15$,
 m_1, m_2 and m_3 are independently integers from 0 to 3, such that $1 \leq m_1 + m_2 + m_3 \leq 3$, and wherein

one or more $-\text{CH}_2-$ groups present in the hydrocarbon chain of (III) may be replaced, independently, by one or more groups selected from $-\text{O}-$, $-\text{CH}=\text{CH}-$ or $-\text{C}\equiv\text{C}-$, with the proviso that the carbon-carbon double bond of P is not directly connected to the carbon atom of Y^1 or Y^2 ,

k is 1,

X is $-\text{O}-$, $-\text{CO}-$, $-\text{COO}-$, $-\text{OCO}-$, $-\text{CH}=\text{CH}-$, $-\text{C}\equiv\text{C}-$, or a single bond, more preferably $-\text{O}-$, $-\text{COO}-$, $-\text{OCO}-$ or a single bond,

t is 1.

36. Use of a chiral or achiral rod shaped compound according to any one of claims 21 to 35 for the preparation of mesogenic polymer mixtures according to any one of claims 1 to 20.
37. Polymer networks prepared from a mixture according to any one of claims 1 to 20.
38. Liquid crystalline polymer films prepared from a mixture according to any one of claims 1 to 20.
39. Use of a polymer network according to claim 37 or a liquid crystalline polymer film according to claim 38 for the preparation of unstructured or structured optical and electro-optical components and multilayer systems.
40. Use of a mixture according to any one of claims 1 to 20 for the preparation of an elastomer, polymer gel, polymer network or polymer film.
41. Use of a polymer network according to claim 37 or of a liquid crystalline polymer film according to claim 38 for the manufacture of devices such as waveguides,

optical gratings, filters, retarders, polarizers, piezoelectric cells or thin film exhibiting non-linear optical properties.

42. Optical or electro-optical components comprising a polymer network according to claim 37 or a liquid crystalline polymer film according to claim 38.